

WHAT IS CLAIMED IS:

1. An image processing apparatus comprising:

an obtaining section for obtaining image data generated by converting an optical image passing through an optical system into digital data; and

5 a processing section for applying a degradation function based on a degradation characteristic of at least one optical element comprised in said optical system to said image data and restoring said image data by compensating for a degradation thereof.

10 2. The image processing apparatus according to claim 1, wherein

said degradation function depends on a position of each pixel.

15 3. The image processing apparatus according to claim 1, wherein

said degradation function is based on a focal length, an in-focus lens position and an aperture value.

4. The image processing apparatus according to claim 3, wherein

said degradation function is generated from conditions of a lens system and a diaphragm in said optical system.

20 5. The image processing apparatus according to claim 1, wherein

said degradation function corresponds to a plurality of pixels.

6. The image processing apparatus according to claim 1, wherein

said processing section processes part of said image data, said part of said

25 image data being determined on the basis of a difference between a pixel value of each

pixel and pixel values of pixels adjacent to said each pixel.

7. The image processing apparatus according to claim 1, wherein
said processing section processes part of said image data, said part of said
5 image data being determined on the basis of said degradation function.

8. The image processing apparatus according to claim 1, wherein
said processing section processes part of said image data, said part of said
image data being determined on the basis of pixel values in said image data.

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9. An image pick-up apparatus comprising:
a generating section for generating image data by converting an optical image
passing through an optical system into digital data; and
an outputting section for outputting said image data out of said apparatus
15 together with information for restoring said image data, said information including a
degradation function based on a degradation characteristic of at least one optical element
comprised in said optical system.

10. An image processing apparatus comprising:
20 a receiving section for receiving a plurality of image data sets generated by two
or more consecutive image captures;
a calculating section for calculating a degradation function on the basis of a
difference between said plurality of image data sets; and
a restoring section for restoring one of said plurality of image data sets by
25 applying said degradation function.

11. The image processing apparatus according to claim 10, wherein
said one of said plurality of image data sets is restored without a sensor which
detects a shake of an image capturing device.

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12. The image processing apparatus according to claim 10, wherein
said degradation function is generated as a two-dimensional filter on the basis
of a track of a subject on images of said plurality of image data sets.

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13. The image processing apparatus according to claim 10, wherein
said degradation function is generated for each of representative positions on
one of images of said plurality of image data sets.

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14. The image processing apparatus according to claim 10, wherein
any other image data set than said one of said plurality of image data sets is
generated by a shorter-time image capture than said one of said plurality of image data
sets.

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15. The image processing apparatus according to claim 10, wherein
any other image than an image of said one of said plurality of image data sets
has less pixels than said image of said one of said plurality of image data sets.

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16. The image processing apparatus according to claim 10, wherein
any other image than an image of said one of said plurality of image data sets is
a live view image.

17. An image pick-up apparatus comprising:

a generating section for generating a plurality of image data sets generated by two or more consecutive image pick-up;

5 a calculating section for calculating a degradation function on the basis of a difference between said plurality of image data sets to restore one of said plurality of image data sets; and

10 an outputting section for outputting said one of said plurality of image data sets out of said apparatus together with said degradation function so as to restore said one of said plurality of image data sets with said degradation function.

18. The image pick-up apparatus according to claim 17, wherein

said image pick-up apparatus is portable.

15 19. An image processing apparatus comprising:

a setting section for setting partial areas in a whole image, said partial areas being delimited according to contrast in said whole image; and

20 a modulating section for modulating images comprised in said partial areas on the basis of a degradation characteristic of said whole image to restore said whole image.

20. An image processing apparatus comprising:

a setting section for setting partial areas in a whole image on the basis of at least one degradation characteristic of said whole image; and

25 a modulating section for modulating images comprised in said partial areas on the basis of said at least one degradation characteristic to restore said whole image.

21. The image processing apparatus according to claim 20, wherein
said at least one degradation characteristic is derived from a shake of an image
capturing device, said whole image being captured by said image capturing device.

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22. An image processing apparatus comprising:
a setting section for setting partial areas in a whole image on the basis of a
distribution of pixel values in said whole image; and
a modulating section for modulating images comprised in said partial areas on
10 the basis of a degradation characteristic of said whole image to restore said whole image.

23. The image processing apparatus according to claim 22, wherein
said setting section sets said partial areas on the basis of a distribution of
brightness in said whole image.

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24. An image processing apparatus comprising:
a setting section for setting areas to be modulated in a whole image;
a restoring section for restoring said whole image by modulating images in said
areas in accordance with a specified function; and
20 an altering section for altering sizes of said areas in accordance with a restored
whole image, wherein
said restoring section again restores said whole image by modulating images in
said areas whose sizes are altered by said altering section in accordance with said
specified function.

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25. The image processing apparatus according to claim 24, wherein
said setting section sets said areas according to contrast in said whole image.

5 26. The image processing apparatus according to claim 24, wherein
said setting section sets said areas on the basis of at least one degradation
characteristic of said whole image.

10 27. The image processing apparatus according to claim 24, wherein
said setting section sets said areas on the basis of a distribution of pixel values
in said whole image.

28. The image processing apparatus according to claim 24, wherein
said altering section alters said sizes of said areas in accordance with a
distribution of pixel values around areas not to be modulated.